

## ABSTRACT

A tilt-compensated electronic compass can be realized by calculating rather than measuring Earth's magnetic field component  $Z$  in a direction orthogonal to the two measurement axes of a 2-axis magnetic sensor. The orthogonal component  $Z$  can be  
5 calculated using a stored value for the Earth's magnetic field strength applicable over a wide geographic region. The calculation also requires using measured field values from the 2-axis sensor. Once  $Z$  is known, and using input from a 2-axis tilt sensor, compensated orthogonal components  $X$  and  $Y$  can be calculated by mathematically rotating the measured field strength values from a tilted 2-axis sensor back to the local  
10 horizontal plane. Thus, a very flat and compact tilt-compensated electronic compass is possible.